

REMARKS

In the Office Action, the Examiner rejected claims 1, 2, 7-9, 11-18, 19, 20, 22-24, 26, 29, 35, 38, 43, 46 and 49 under 35 USC §102 and claims 3, 4, 6, 21, 25, 27, 28, 33, 34, 36, 37, 42, 44, 45, 47 and 48 35 USC §103. The Examiner further indicated that claims 5 and 10 are objected as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claim. The claims have been amended in accordance with the Examiner's indication of allowable subject matter. The claim rejections are fully traversed below. Claims 1-59 remain pending.

Reconsideration of the application is respectfully requested based on the following remarks.

REJECTION OF CLAIMS UNDER 35 USC §102

In the Office Action, the Examiner rejected claims 1, 2, 7-9, 11-18, 19, 20, 22-24, 26, 29, 35, 38, 43, 46 and 49 under 35 USC §102 as being anticipated by Armangau, U.S. Patent No. 6,434,681, ('Armangau' hereinafter). Applicant respectfully traverses this assertion.

System services such as those providing I/O functionality are often structured in the form of a stack. However, in the event of a system failure, one or more of the services in the stack may become inoperative. In fact, even one non-functional layer in the stack can prevent normal system (e.g., I/O) functioning.

The present invention provides a secondary mechanism for performing a system function such as I/O functionality. This is accomplished through a set of primitive functions corresponding to a set of system services. The primitive functions, although "equivalent" to the set of system services, are reduced in functionality as well as performance. In this manner, a secondary mechanism for performing the set of system services is made available in the event of a system error.

It is important to note that the primitive functions are made available via requests that are sent automatically (without human intervention). These requests are sent by the set of system services (or stack of system services). In response to the requests, the appropriate

primitive function(s) are identified. None of the cited references, separately or in combination, discloses or suggests the claimed invention.

Armangau discloses a snapshot copy facility for a data storage system permitting continued host read/write access. See title. In no manner does Armangau disclose a primitive function in any manner. In fact, the Examiner cites col. 8, lines 35-39 and col. 22, lines 5-10, which describes a process of restoring backup data. Data is not a function. Thus, Armangau fails to disclose or suggest automatically sending a request for a primitive function from one of a set of software services to another one of the set of software services. Similarly, Armangau fails to disclose receiving an identifier associated with a requested primitive function. The Examiner cites col. 8, lines 21-25, which discusses an identification tag. However, again, this identification tag is associated with backup data, not a function that replicates a system service. Since the backup data is merely data, the identification tag cannot be used to “call” a function instead of another one of the system services.

The Examiner refers to col. 22, lines 5-10, citing “primitive services.” However, Applicant was unable to find such a reference. While Applicant agrees that the term “snapshot copy” does indicate a “replicating” of data, the data replicates other data. It does not replicate a system service. It is also important to note that Armangau does not disclose or suggest data that obtains its own replacement data. As such, Armangau neither discloses nor suggests one of a set of system services obtaining a primitive function that can be called by one of the set of system services instead of another one of the set of system services. Of course, the very nature of data prevents such functionality. Accordingly, Armangau fails to anticipate the claimed invention.

REJECTION OF CLAIMS UNDER 35 USC §103

In the Office Action, the Examiner rejected claims 3, 4, 6, 21, 25, 27, 28, 33, 34, 36, 37, 42, 44, 45, 47 and 48 under 35 USC §103 as being unpatentable over Armangau in view of Ahlin et al, U.S. Patent No. 5,321,840, (‘Ahlin’ hereinafter). Claims 31, 40 and 51 are rejected under 35 USC §103 as being unpatentable over Armangau in view of Glasser et al, U.S. Patent No. 5,793,980, (‘Glasser’ hereinafter). Claims 30, 32, 39, 41, 50 and 52 are rejected under 35 USC §103 as being unpatentable over Armangau in view of Halpern et al,

U.S. Patent No. 6,282,711 ('Halpern' hereinafter). These rejections are fully traversed below.

While Ahlin may disclose input and output functions such as keyboard functions, Ahlin fails to cure the deficiencies of the primary reference. It is also important to note that the combination of the cited references would fail to operate as claimed. In fact, the combination of the cited references would merely result in a system performing data backup using input and output functions. Alternatively, combining the references would achieve a system supporting the backup of input/output functions by making "snapshot copies" of the input/output functions. As set forth above, Armangau fails to disclose or suggest data obtaining its own replacement data. Thus, combination of the cited references would fail to result in an automated system enabling system functions such as I/O functions to access their own replacement functions. It is also important to note that neither of the cited references discloses or suggests the problem the claimed invention attempts to solve (e.g., ensuring operation of system services by enabling the system services to access primitive functions replacing the system services). Similarly, neither of the cited references discloses nor suggests a solution to such a problem. Accordingly, Applicant respectfully submits that the claims are patentable over the cited references.

It appears that the Examiner has cited Ahlin merely because it discloses input and output functionality. However, as set forth in Ahlin, the input/output functionality may be implemented in "BIOS" software, which "can be downloaded from the network host when needed, a process which might take place on the order of several times per year." See col. 11, line 65-col. 12, line 14. In other words, the BIOS software must be downloaded by a user. Thus, the software does not automatically access its own replacement functions upon which it depends. Thus, Ahlin teaches away from the claimed invention.

None of the cited references, separately or in combination, discloses or suggests a set of primitive software functions associated with a set of services, the set of primitive software functions replicating the set of services, wherein each of the set of primitive software functions eliminates or reduces reliance on one or more system functions that are capable of becoming non-functional in the event of a system error. The set of primitive functions are particularly useful, for example, when testing system services providing input and/or output functionality or keyboard functionality, as recited in claims 45 and 47.

Claims 18, 29, 38 and 49; claims 30, 32, 39, 41, 50 and 52

Primitive functions may be implemented, for example, by implementing polling rather than interrupts, or by implementing delay loops rather than timers, as recited in claims 49-52, which are less susceptible to problems (and more likely to be functional) in the event of a system error. In no manner do the cited references, separately or in combination, disclose or suggest the calling of a primitive function request mechanism by a software component providing a service. Moreover, none of the cited references discloses or suggests providing an identifier associated with a primitive function to the software component calling the primitive function request mechanism, thereby enabling the software component calling the primitive function request mechanism to call the primitive software function via the returned one or more identifiers. Thus, references such as Halpern which merely disclose functionality such as polling fail to cure the deficiencies of the primary reference.

Claims 31, 40 and 51

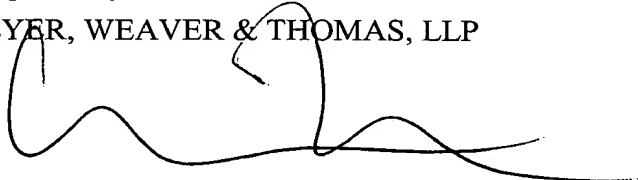
Glasser fails to cure the deficiencies of the primary references. Specifically, although Glasser discloses the use of mechanisms such as delay loops, neither of the cited references discloses the use of these functions in the manner claimed. More specifically, the claimed invention enables primitive functions replicating system services to replace system services in the event of a system error. These system functions and associated primitive functions may implement, for example, input and/or output functionality using mechanisms such as delay loops. In this manner, such functionality is retained, even in the event of a system error, thereby enabling debugging through input/output functionality to be accomplished. None of the cited references, separately or in combination, discloses or suggests the problem of debugging system services after a system error has occurred. Moreover, none of the cited references, separately or in combination, discloses or suggests the inoperability of input/output or keyboard functionality or potential solutions in the event of a system (e.g., hardware) error. Accordingly, Applicant respectfully submits that the pending claims are patentable over the cited art.

The dependent claims are dependent upon one of the independent claims, and are therefore patentable for at least the reasons set forth above. The additional limitations in the independent or dependent claims are not further discussed as the above limitations are sufficient to distinguish the claimed invention from the cited reference. Accordingly, Applicants contend that the rejection is unsupported by the art and should be withdrawn. Thus, it is respectfully requested that the Examiner withdraw the rejection of the dependent claims under 35 USC §103.

If there are any issues remaining which the Examiner believes could be resolved through either a Supplemental Response or an Examiner's Amendment, the Examiner is respectfully requested to contact the undersigned attorney at the telephone number listed below.

Applicants hereby petition for any extension of time which may be required to maintain the pendency of this case, and any required fee for such extension or any further fee required in connection with the filing of this Amendment is to be charged to Deposit Account No. 50-0388 (Order No. SUN1P376).

Respectfully submitted,
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